773. The plating system of claim 772, wherein said bone growth promoting material is selected from one of bone, bone derived products, bone morphogenetic protein, and hydroxyapatite.

774. The plating system of claim 546, wherein at least a portion of said plating system is treated with a bone growth promoting substance.

775. The plating system of claim 546, wherein at least a portion of said plating system is at least in part resorbable.

776. The plating system of claim 546, wherein at least a portion of said plating system is formed of a porous material.

777. The plating system of claim 546, wherein at least a portion of said plating system is treated to promote bone ingrowth between said plate and the adjacent vertebral bodies.--

REMARKS

Applicant amended the title, amended independent claims 538-541, 543, 544, and 546, and added new dependent claims 547-777 to further define Applicant's claimed invention.

In the Office Action, the Examiner allowed claims 539, 541, 545, and 546; rejected claims 538, 540, and 543 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,601,553 to Trebing et al.; and rejected claim 544 under 35 U.S.C. § 103(a) as being unpatentable over Trebing et al.

Applicant amended independent claims 538 and 540 to recite that the thread has a "pitch along at least a portion of the length of said first shaft portion being substantially the same as said pitch along at least a portion of the length of said second shaft portion." No such structure is taught or disclosed by Trebing et al.

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Applicant amended independent claim 543 to recite that the opposed side faces of the thread form an included angle in the range of 11 degrees to 30 degrees "along said thread length." No such structure is taught or disclosed by Trebing et al.

Applicant amended independent claim 544 to recite that the opposed side faces of the thread have "at least three different base thicknesses" therebetween in the range of 0.25 mm to 0.60 mm at the base. No such structure is taught, disclosed, or suggested by Trebing et al.

Applicant submits that the rejections of claims 538, 540, 543, and 544 have been overcome and that the claims are allowable over the art of record. It is submitted that dependent claims 547-777 are allowable at least due to their dependency from an allowed or allowable independent claim, or claim dependent therefrom.

In view of the foregoing amendments and remarks, Applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 50-1066.

Respectfully submitted,

MARTIN & FERRARO, LLP

Dated: 1-08-03

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PATENT
Attorney Docket No. 101.0056-07000
Customer No. 22882

CHANGES TO THE TITLE

Please amend the title as follows:

ANTERIOR CERVICAL PLATING SYSTEM~~, INSTRUMENTATION,~~ AND BONE SCREW ~~METHOD OF INSTALLATION~~

C

PATENT
Attorney Docket No. 101.0056-07000
Customer No. 22882

CHANGES TO THE CLAIMS

Please amend the claims as follows:

538. (Amended) A plating system, comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a head adapted to block further forward motion of said screw through said bone screw receiving hole of said plate;

a tip for insertion into the cervical vertebral body;

a shaft between said tip and said head, said shaft having a mid-longitudinal axis and a root diameter at transverse cross sections along the mid-longitudinal axis, said shaft having a first shaft portion proximate said tip and a second shaft portion proximate said head, the root diameter of said first shaft portion being less than the root diameter of said second shaft portion; and

a thread along at least a portion of said shaft adapted to engage the cervical vertebral body, said thread having an outer diameter that is generally uniform along at least a substantial portion of each of said first and second shaft portions, said thread having a pitch, said pitch along at least a portion of the length of said first shaft portion being substantially the same as said pitch along at least a portion of the length of said second shaft portion, said thread having opposed side faces angled relative to each other to form a base at said root diameter of said shaft, said base being smaller proximate said second shaft

portion than proximate said first shaft portion, said screw being made of a material suitable for implantation into the human skeleton.

539. (Amended) A plating system, comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a head adapted to block further forward motion of said screw through said bone screw receiving hole of said plate;

a tip for insertion into the cervical vertebral body;

a shaft between said tip and said head, said shaft having a mid-longitudinal axis and a root diameter at transverse cross sections along the mid-longitudinal axis, said shaft having a first shaft portion proximate said tip and a second shaft portion proximate said head, the root diameter of said first shaft portion being less than the root diameter of said second shaft portion; and

a thread along at least a portion of said shaft adapted to engage the cervical vertebral body, said thread having an outer diameter that is generally uniform along at least a substantial portion of each of said first and second shaft portions, said thread having a profile with opposed side faces and a crest, said crest along at least a portion of the length of said first shaft portion being substantially uniform ~~to said crest~~ along at least a portion of the length of said second shaft portion proximate said head, said screw being made of a material suitable for implantation into the human skeleton.

540. (Amended) A plating system, comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a head adapted to block further forward motion of said screw through said bone screw receiving hole of said plate;

a tip for insertion into the cervical vertebral body;

a shaft between said tip and said head, said shaft having a mid-longitudinal axis and a root diameter at transverse cross sections along the mid-longitudinal axis, said shaft having a first shaft portion proximate said tip and a second shaft portion proximate said head, the root diameter of said first shaft portion being less than the root diameter of said second shaft portion; and

a thread along at least a portion of said shaft adapted to engage the cervical vertebral body, said thread having an outer diameter that is generally uniform along at least a substantial portion of each of said first and second shaft portions, said thread having opposed side faces intersecting at an angle to form a crest along at least a portion of the length of said second shaft portion proximate said head, said thread having a pitch, said pitch along at least a portion of the length of said first shaft portion being substantially the same as said pitch along at least a portion of the length of said second shaft portion, said screw being made of a material suitable for implantation into the human skeleton.

541. (Amended) A plating system, comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at

least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a head adapted to block further forward motion of said screw through said bone screw receiving hole of said plate;

a tip for insertion into the cervical vertebral body;

a shaft between said tip and said head, said shaft having a mid-longitudinal axis and a root diameter at transverse cross sections along the mid-longitudinal axis, said root diameter of said shaft being curved along at least a portion of the length of said shaft in a direction ~~parallel to a~~ between said head and said tip along the mid-longitudinal axis of said shaft, said shaft having a first shaft portion proximate said tip and a second shaft portion proximate said head, the root diameter of said first shaft portion being less than the root diameter of said second shaft portion; and

a thread along at least a portion of said shaft adapted to engage the cervical vertebral body, said thread having an outer diameter that is generally uniform along at least a substantial portion of each of said first and second shaft portions, said screw being made of a material suitable for implantation into the human skeleton.

543. (Amended) A plating system, comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a shaft having a leading end configured to pass at least in part through said plate and adapted for insertion into the bone of a cervical vertebral body and a trailing end opposite said leading end, said shaft having a mid-longitudinal axis and a root diameter at transverse cross sections along the mid-longitudinal axis; and

a thread having a length along at least a portion of said shaft, said thread adapted to engage the bone of the vertebral body, said thread having opposed side faces being angled relative to each other to form an apex of said thread, said side faces forming an included angle in the range of 11 degrees to 30 degrees along said thread length, said screw being made of a material suitable for human implantation.

544. (Amended) A plating system, comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a shaft having a leading end configured to pass at least in part through said plate and adapted for insertion into the bone of a cervical vertebral body, a mid-longitudinal axis, and a trailing end opposite said leading end, said shaft having a root diameter at transverse cross sections along the mid-longitudinal axis; and

a thread along at least a portion of said shaft, said thread adapted to engage the bone of the cervical vertebral body, said thread having opposed side

faces, said side faces being angled relative to each other to form a base at said root diameter of said shaft and a crest opposite said base, said side faces having ~~a thickness~~ at least three different base thicknesses therebetween in the range of 0.25 mm to 0.60 mm at said base, said screw being made of a material suitable for human implantation.

546. (Amended) A plating system comprising:

an anterior cervical plate adapted to be applied to the anterior human cervical spine, said plate having a lower surface adapted to contact the anterior aspect of at least one cervical vertebral body and an upper surface opposite said lower surface, at least one bone screw receiving hole extending from said upper surface through said lower surface, said bone screw receiving hole being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine; and

a bone screw adapted to attach said plate to the cervical vertebral body, said bone screw comprising:

a tip;

a head having a length in the range of 1 mm to 3 mm and a diameter in the range of 3.8 mm to 7.0 mm;

a shaft having a maximum root diameter in the range of 3.6 mm to 5.2 mm, said root diameter of said shaft being tapered from proximately below said head ~~above said tip~~ along the longitudinal axis of said shaft to proximately above said tip ~~below said head~~, said shaft having a length in the range of 10 mm to 22 mm; and

a thread on said shaft having a pitch in the range of 1.25 mm to 2.5 mm with a sharp and thin profile, said thread having two faces angled relative to each other to form an apex having an angle in the range of 11 degrees to 21 degrees, said thread having a base that is in the range of 0.25 to 0.6 mm thick, said thread having an outer diameter ~~of said thread being~~ that is generally constant along a substantial portion of the length of said shaft.